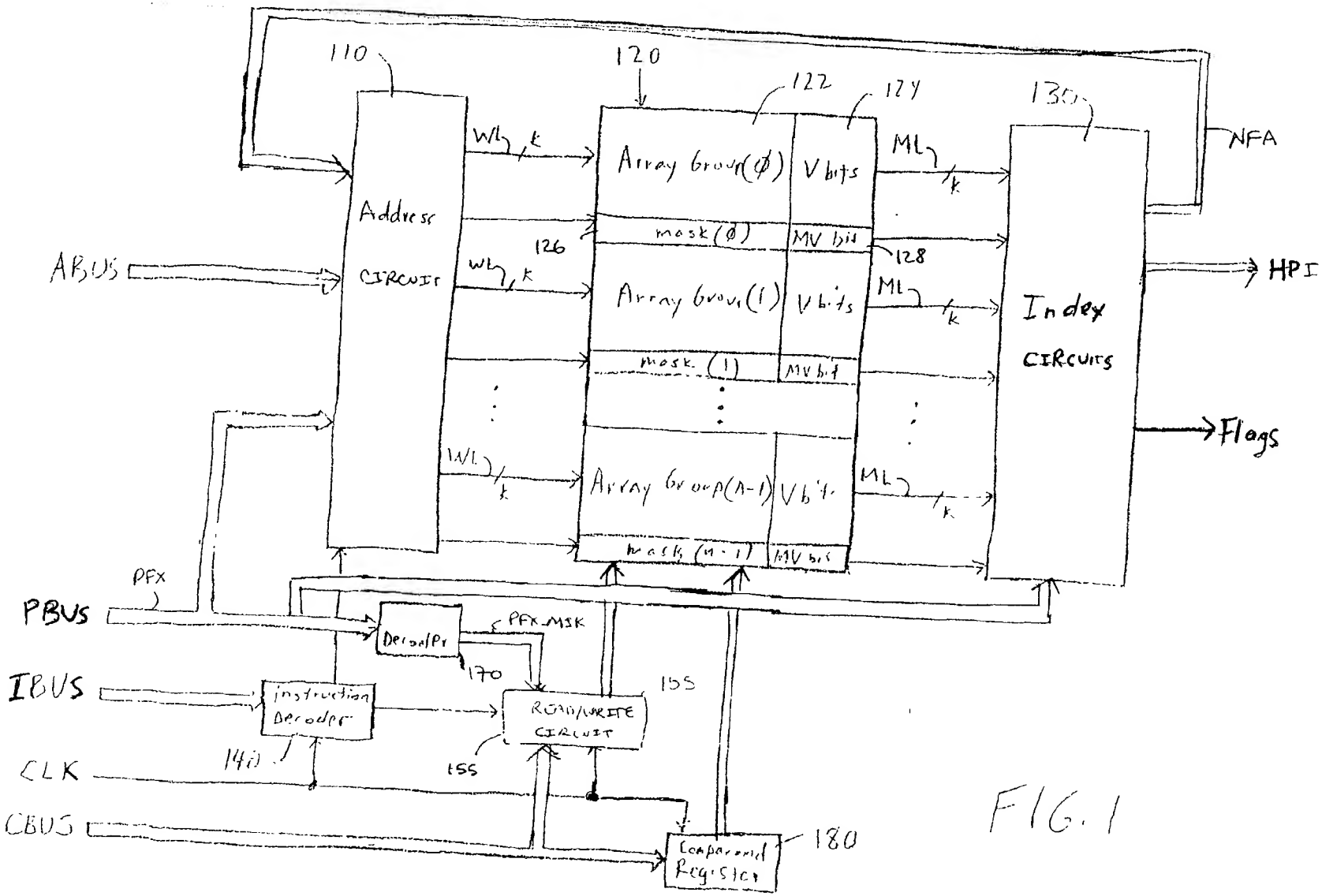
100
110
120
122
124
130
NFA
ABUS
Address
CIRCUIT
WL, k
126
Array Group(0)
V bits
mask(0)
MV bit
128
ML
k
Array Group(1)
mask (1)
Array Group(N-1)
mask (M-1)
Index
CIRCUITS
HPI
Flags
PFX
PBUS
Decoder
PFX-MSK
170
IBUS
Instruction
Decoder
140
155
READ/WRITE
CIRCUIT
CLK
CBUS
Comparand
Register
180

FIG. 1

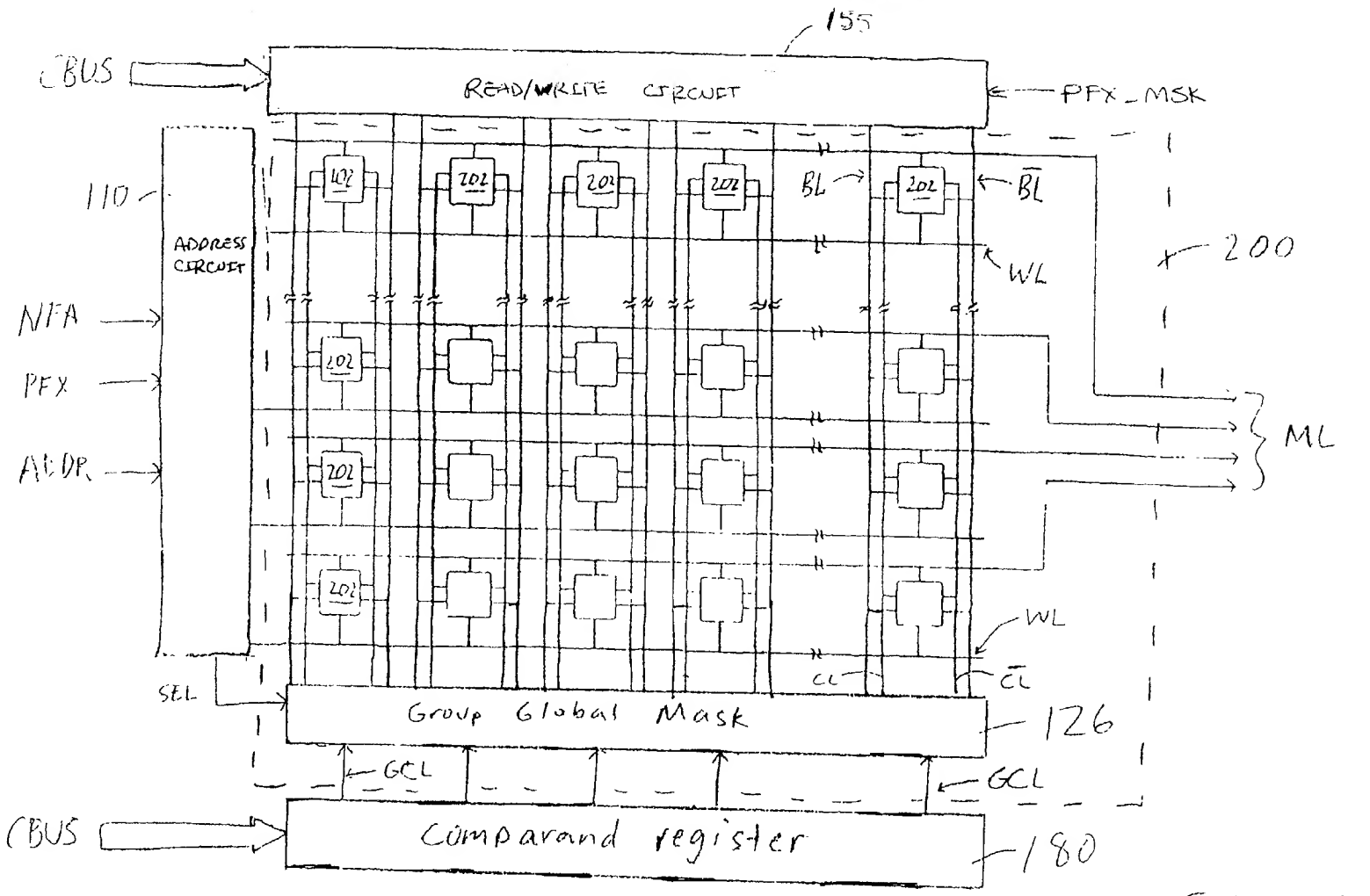
155
CBUS
READ/WRITE CIRCUIT
PFX_MSK
110
ADDRESS CIRCUIT
201
BL
$\overline{BL}$
WL
200
NFA
PFX
ADDR
ML
WL
CL
$\overline{CL}$
SEL
Group Global Mask
126
GCL
GCL
CBUS
Comparand register
180

FIG. 2

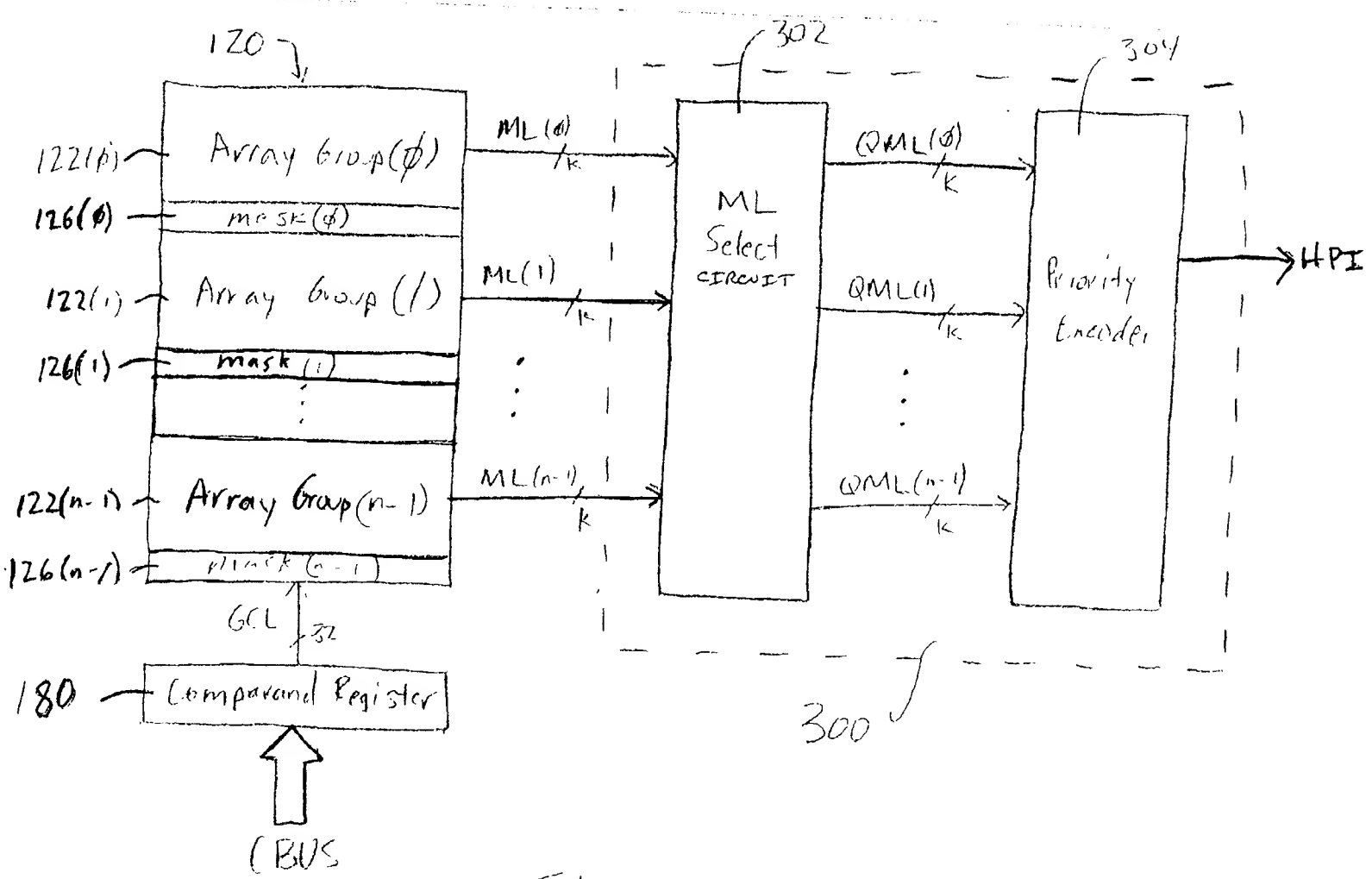
120
302
304
122(0)
Array Group(0)
126(0)
mask(0)
122(1)
Array Group(1)
126(1)
mask(1)
122(n-1)
Array Group(n-1)
126(n-1)
mask(n-1)
ML(0)
k
ML(1)
k
ML(n-1)
k
ML Select CIRCUIT
QML(0)
k
QML(1)
k
QML(n-1)
k
Priority Encoder
HPI
GCL
32
180
Compared Register
CBUS
300

FIG. 3

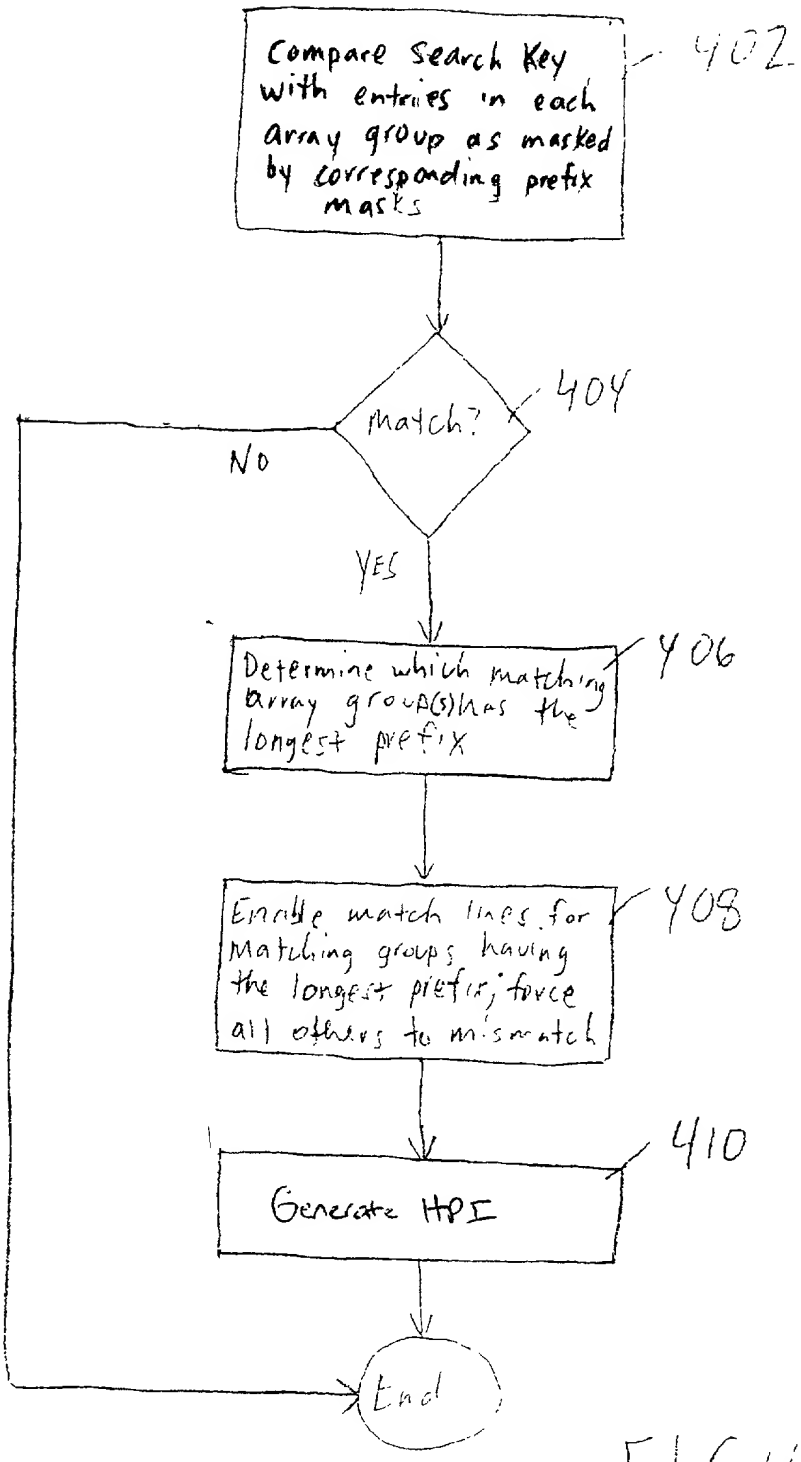
Compare Search Key with entries in each array group as masked by corresponding prefix masks
402
match?
404
No
YES
Determine which matching array group(s) has the longest prefix
406
Enable match lines for matching groups having the longest prefix; force all others to mismatch
408
Generate HPI
410
End

FIG 4

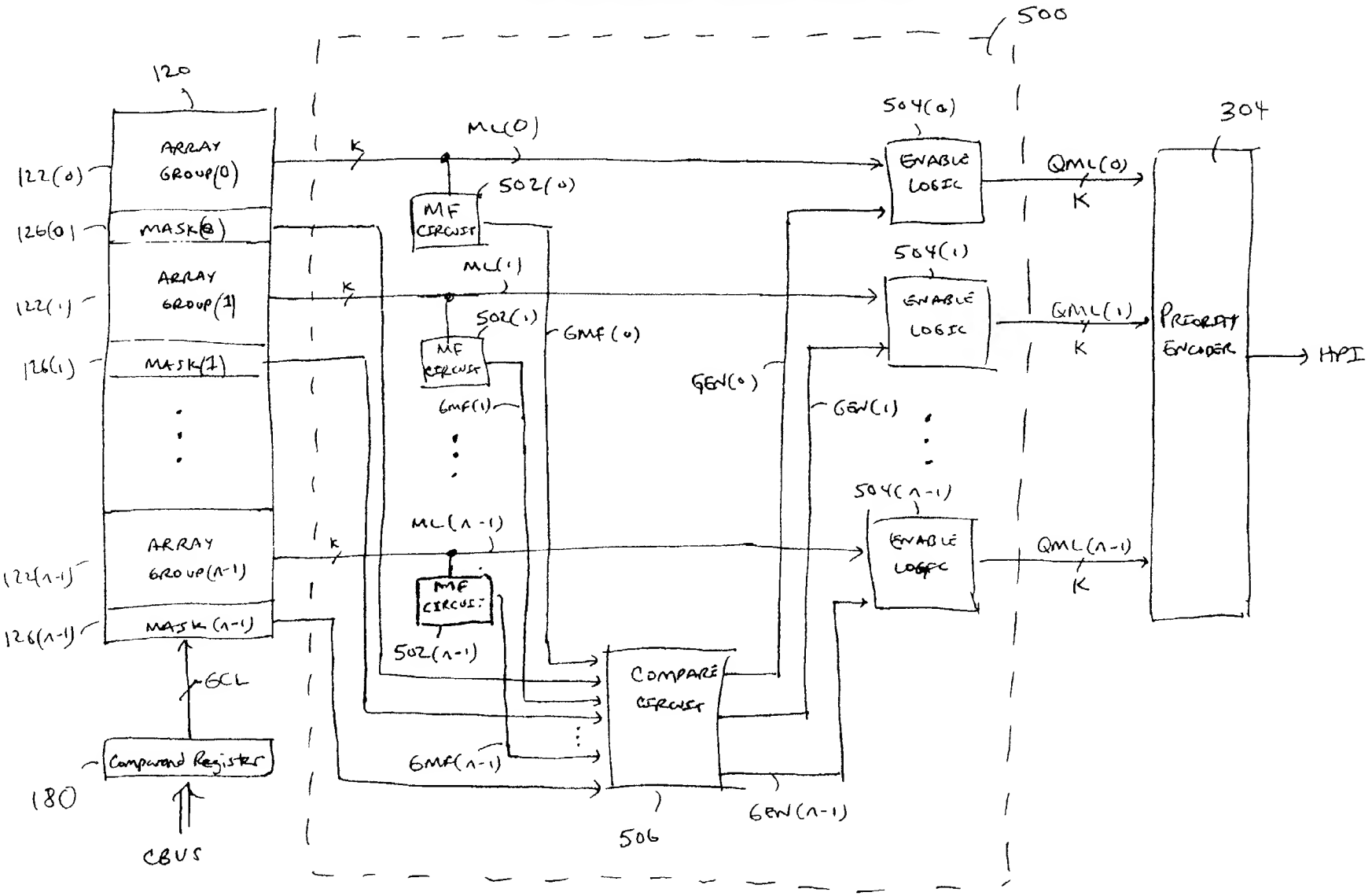

FIG. 5A

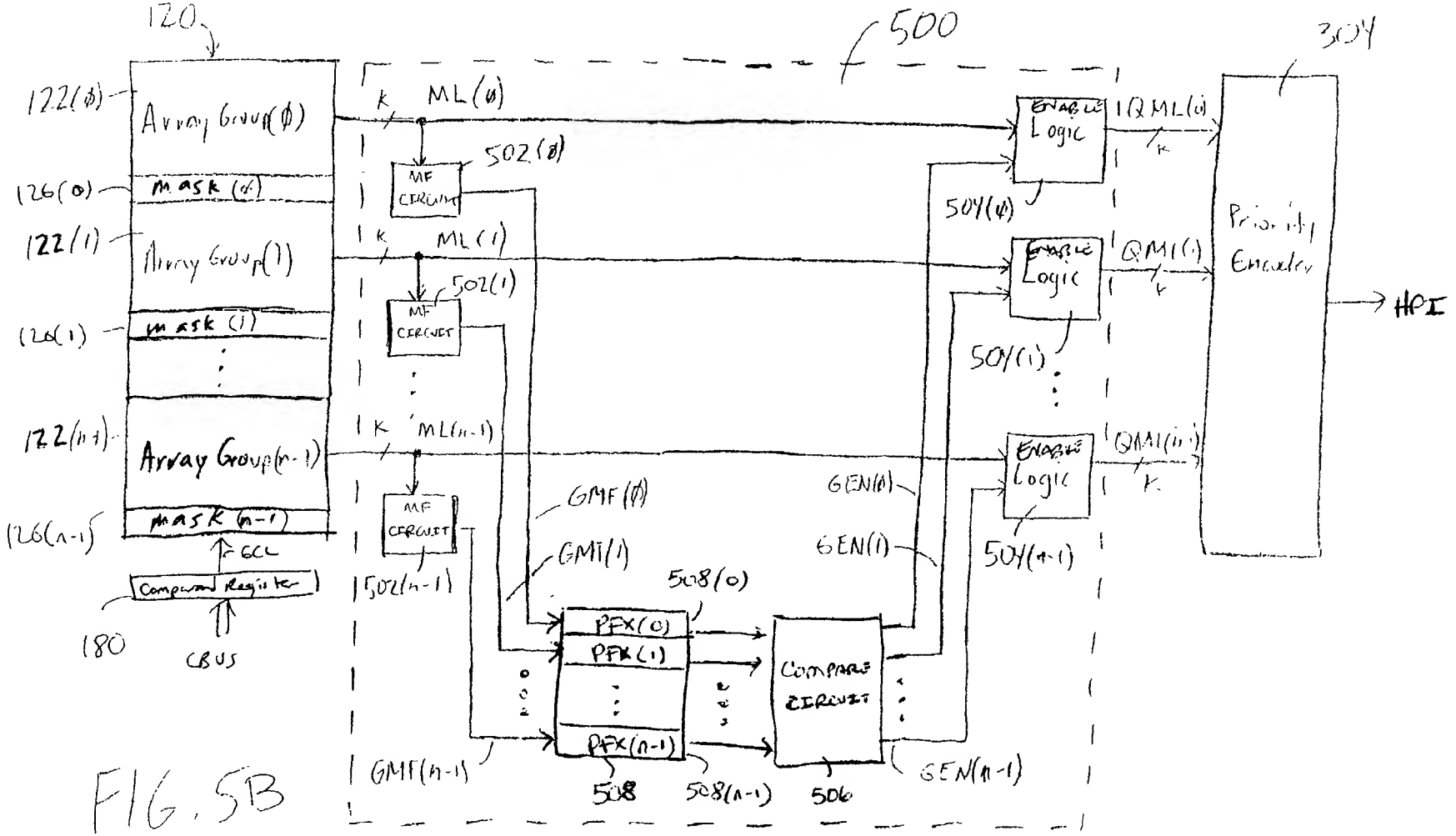

FIG. 5B

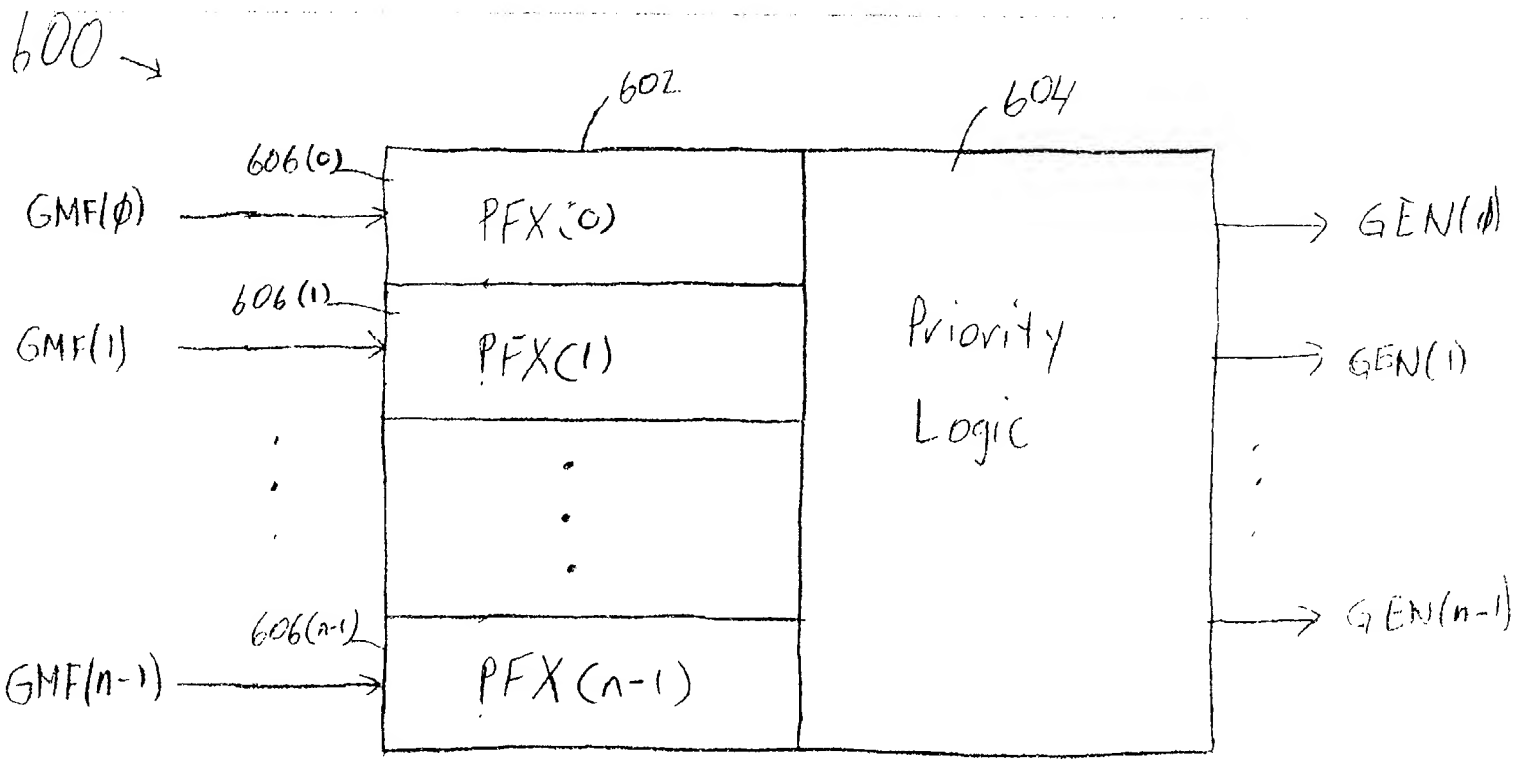

FIG. 6

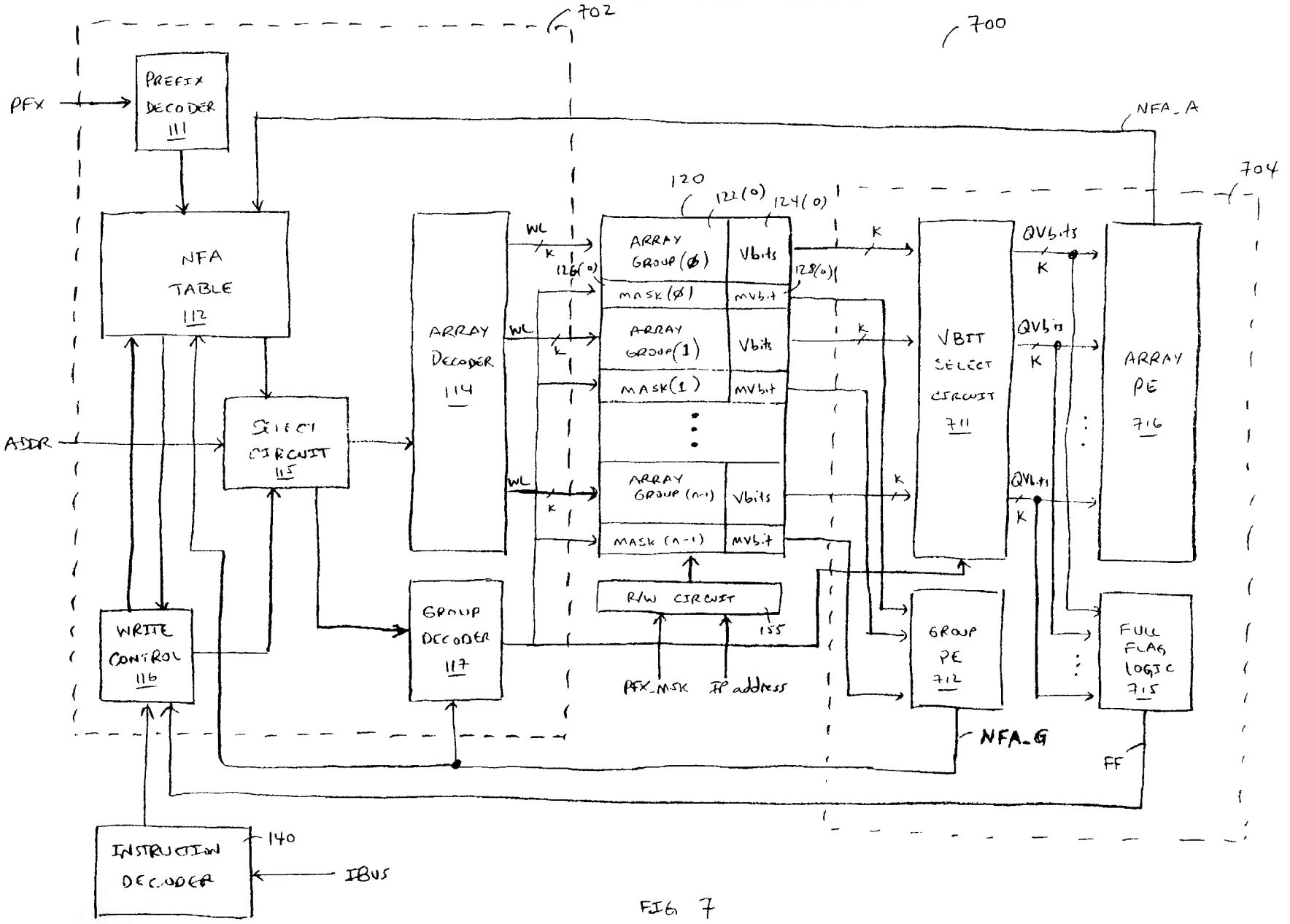
700
702
704
PFX
PREFIX DECODER 111
NFA_A
NFA TABLE 112
ADDR
SELECT CIRCUIT 115
ARRAY DECODER 114
WRITE CONTROL 116
GROUP DECODER 117
120
122(0)
124(0)
126(0)
128(0)
WL
K
ARRAY GROUP (Ø)
Vbits
MASK (Ø)
MVbit
ARRAY GROUP (1)
MASK (1)
ARRAY GROUP (n-1)
MASK (n-1)
R/W CIRCUIT
155
PFX_MSK
IP address
VBIT SELECT CIRCUIT 711
QVbits
QVbit
QVbit
ARRAY PE 716
GROUP PE 712
FULL FLAG LOGIC 715
NFA_G
FF
INSTRUCTION DECODER
140
IBUS

FIG 7

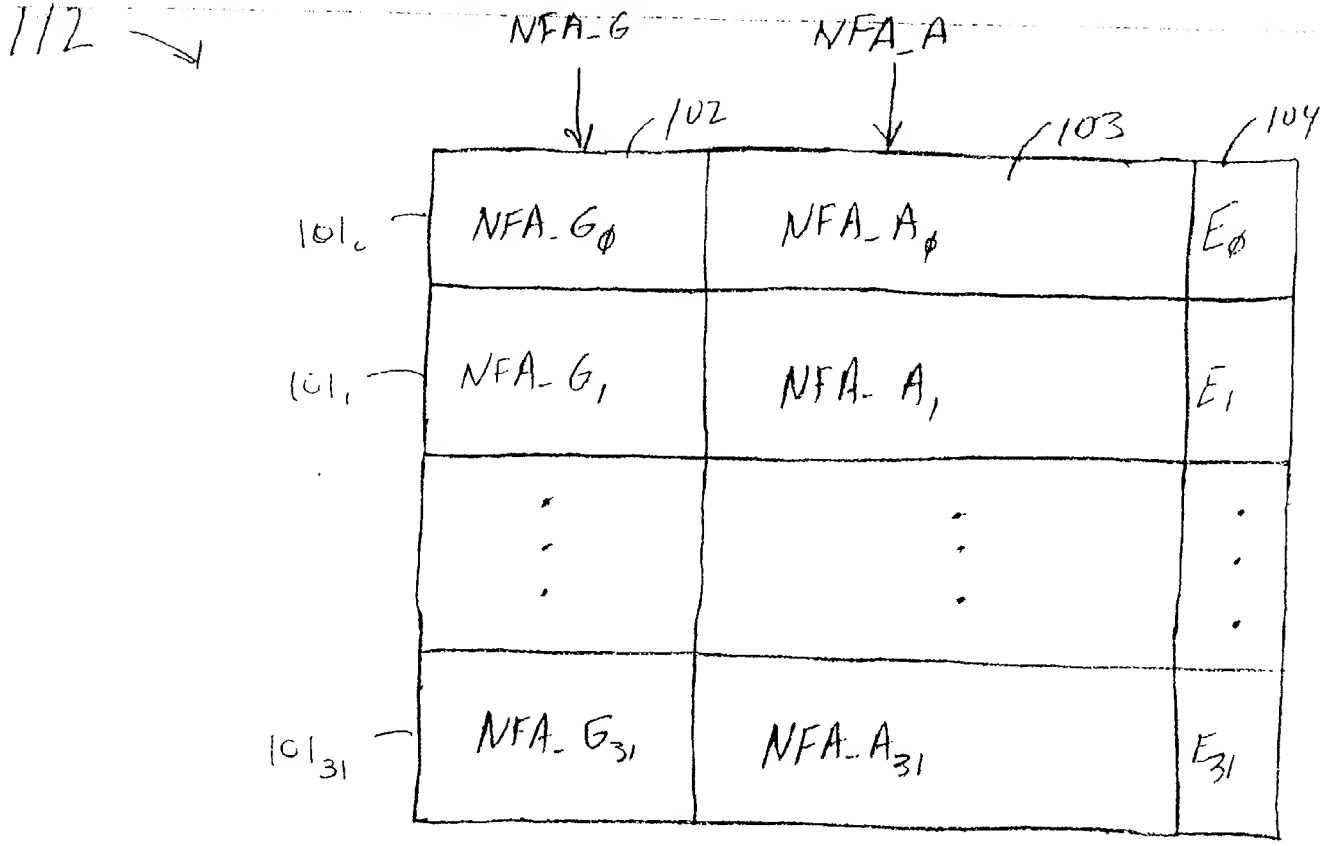

FIG. 8

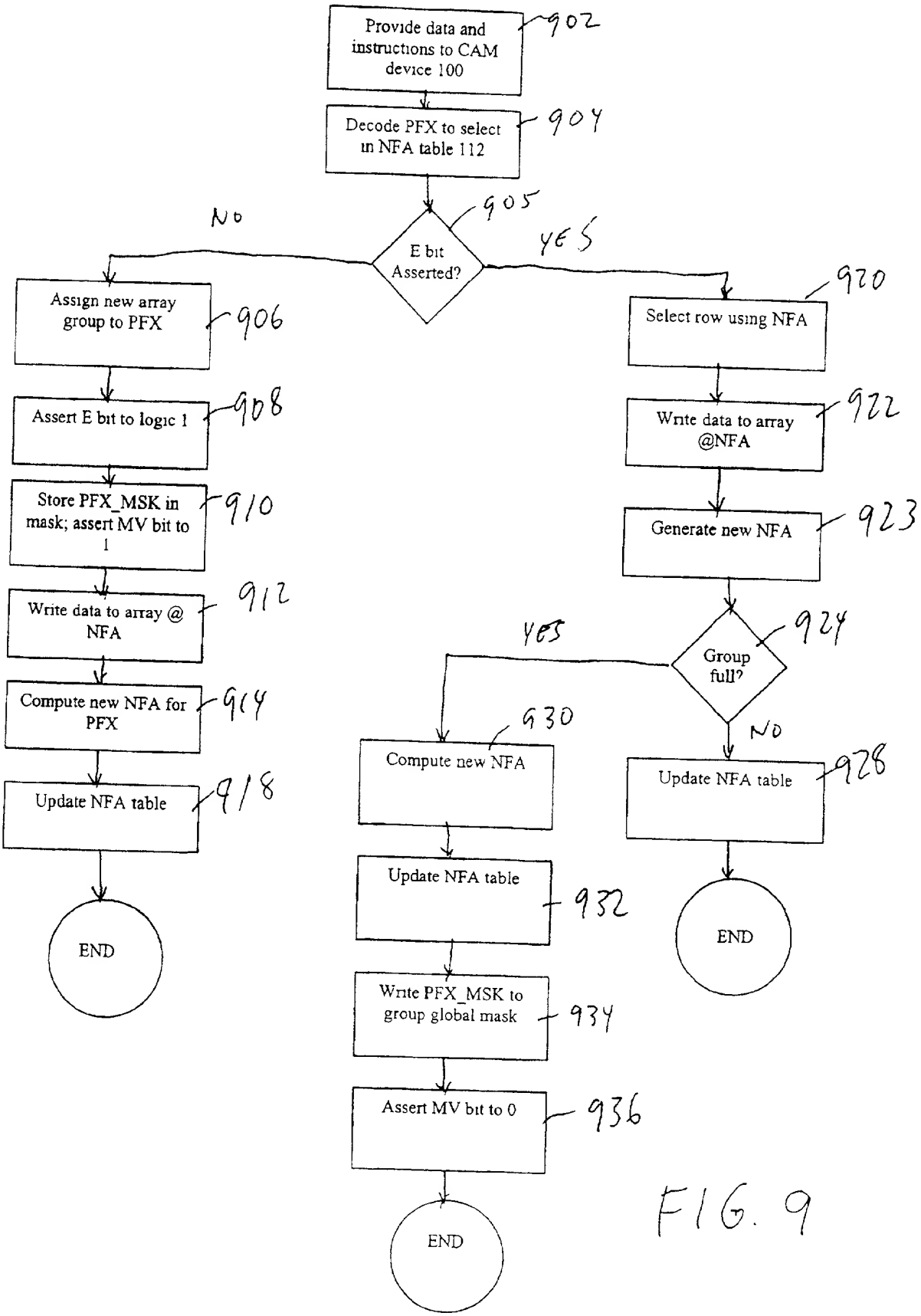
Provide data and instructions to CAM device 100
902
Decode PFX to select in NFA table 112
904
E bit Asserted?
905
No
Yes
Assign new array group to PFX
906
Assert E bit to logic 1
908
Store PFX_MSK in mask; assert MV bit to 1
910
Write data to array @ NFA
912
Compute new NFA for PFX
914
Update NFA table
918
END
Select row using NFA
920
Write data to array @NFA
922
Generate new NFA
923
Group full?
924
Yes
No
Compute new NFA
930
Update NFA table
932
Write PFX_MSK to group global mask
934
Assert MV bit to 0
936
END
Update NFA table
928
END

FIG. 9

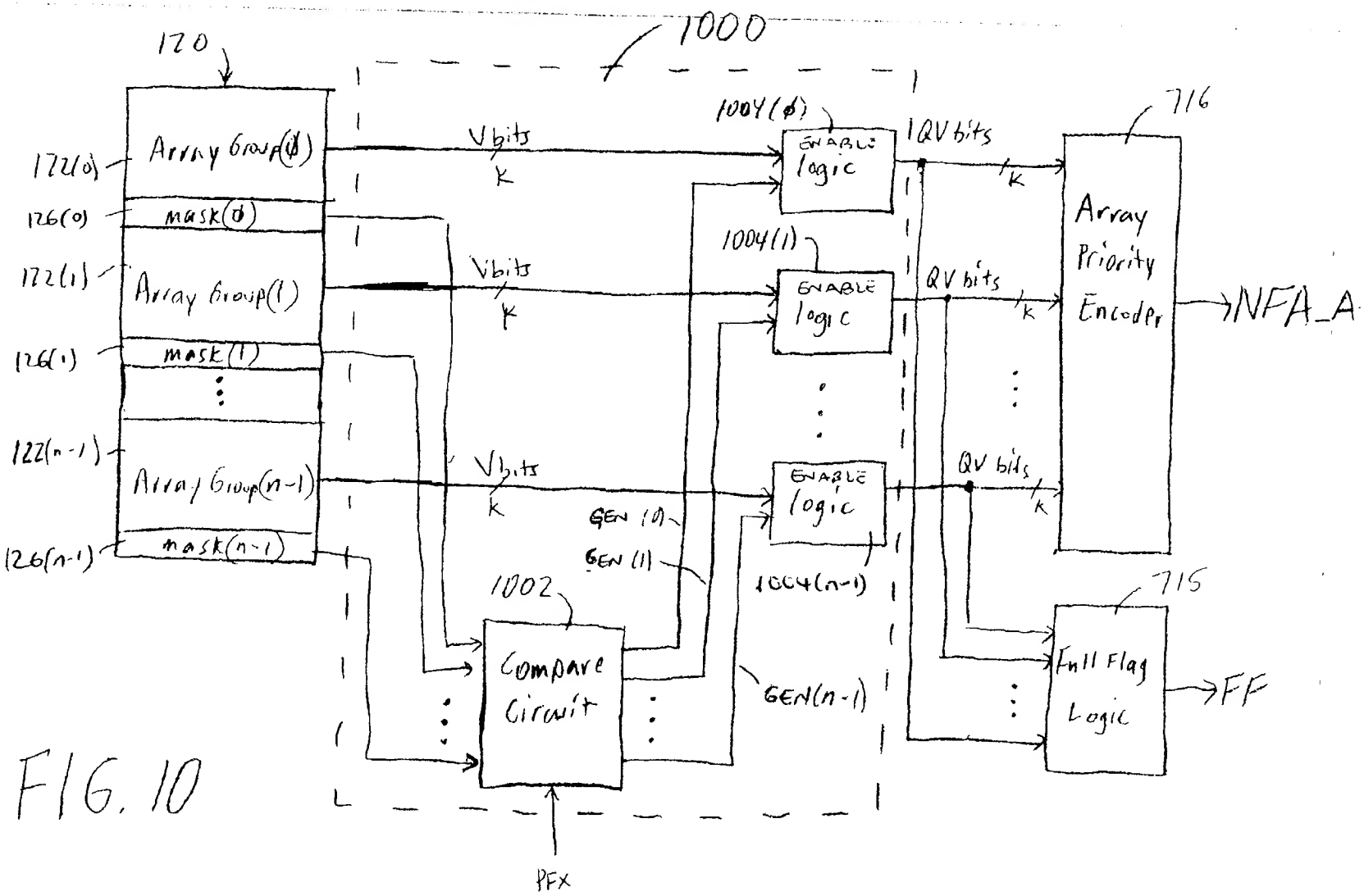
120
1000
Array Group(0)
Array Group(1)
Array Group(n-1)
122(0)
122(1)
122(n-1)
126(0)
126(1)
126(n-1)
mask(0)
mask(1)
mask(n-1)
Vbits
k
1004(0)
1004(1)
1004(n-1)
ENABLE logic
1QV bits
QV bits
716
Array Priority Encoder
NFA_A
GEN (0)
GEN (1)
GEN(n-1)
1002
Compare Circuit
715
Full Flag Logic
FF
PFX

FIG. 10

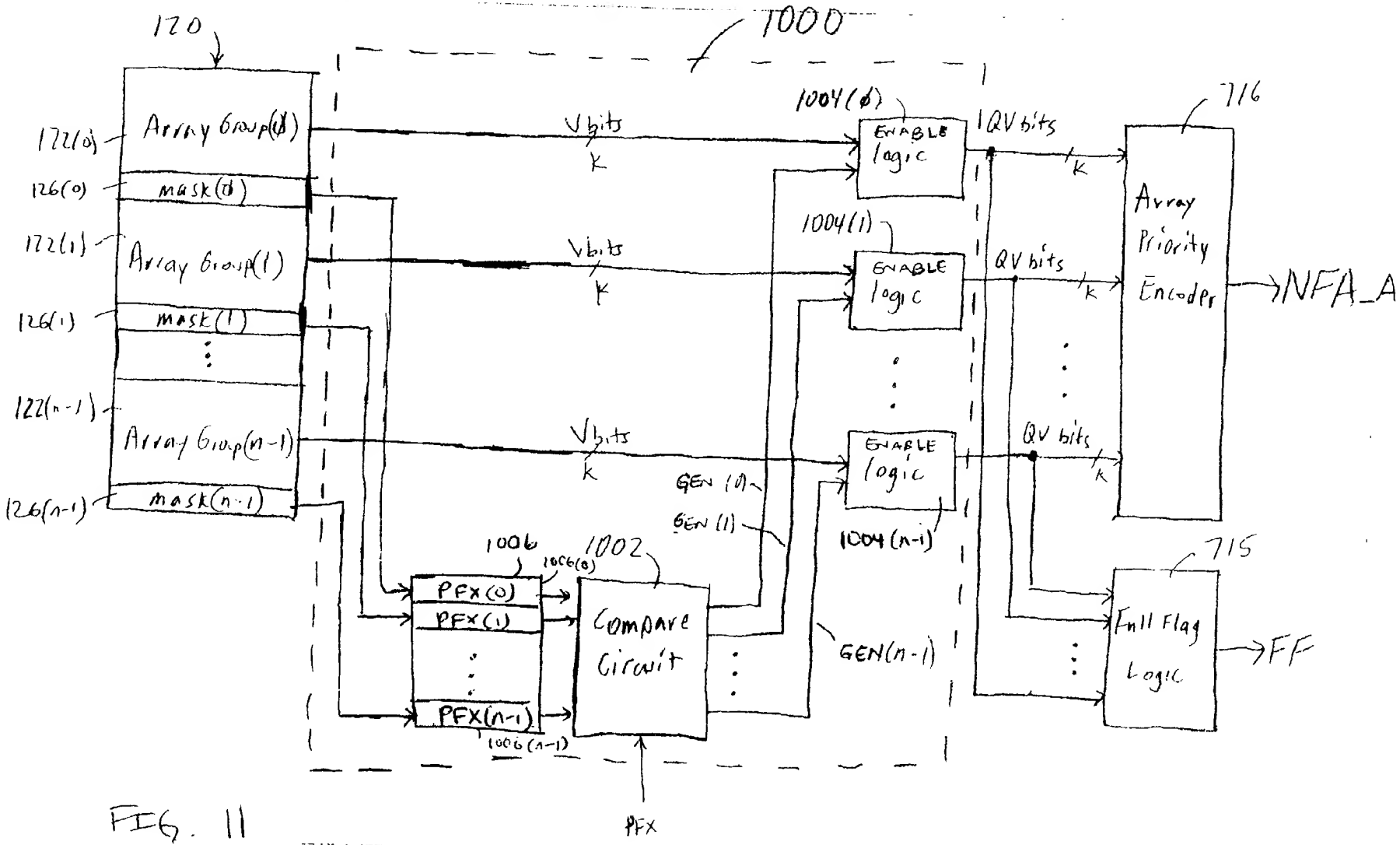
120
1000
122(0)
Array Group(0)
126(0)
mask(0)
122(1)
Array Group(1)
126(1)
mask(1)
122(n-1)
Array Group(n-1)
126(n-1)
mask(n-1)
Vbits
k
1004(0)
ENABLE logic
1004(1)
ENABLE logic
ENABLE logic
1004(n-1)
QV bits
k
716
Array Priority Encoder
NFA_A
GEN (0)
GEN (1)
GEN(n-1)
1006
1006(0)
1006(n-1)
PFX(0)
PFX(1)
PFX(n-1)
1002
Compare Circuit
715
Full Flag Logic
FF
PFX

FIG. 11

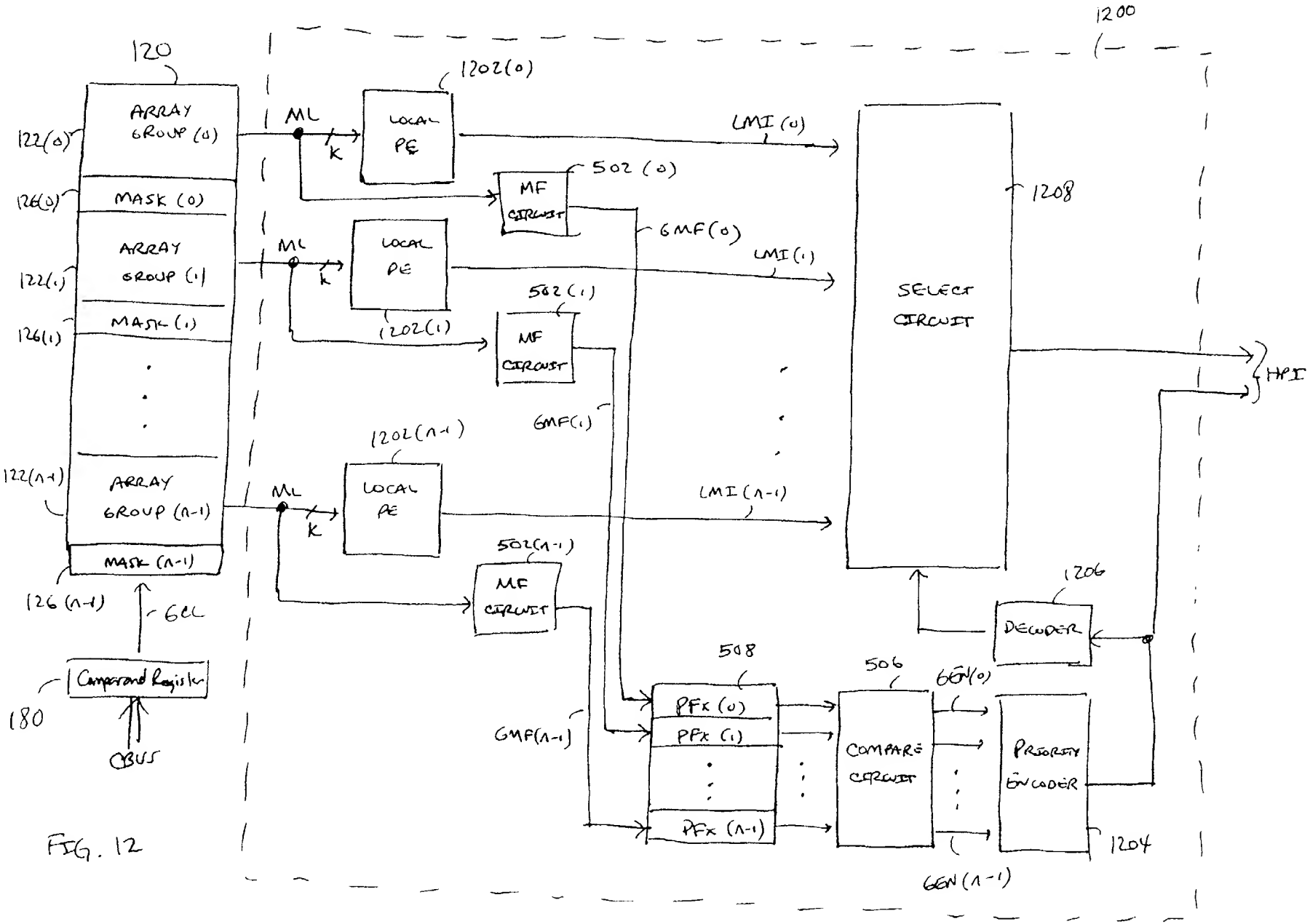
1200
120
ARRAY GROUP (0)
122(0)
MASK (0)
126(0)
ARRAY GROUP (1)
122(1)
MASK (1)
126(1)
ARRAY GROUP (n-1)
122(n-1)
MASK (n-1)
126 (n-1)
ML
k
LOCAL PE
1202(0)
1202(1)
1202(n-1)
MF CIRCUIT
502 (0)
502 (1)
502(n-1)
LMI (0)
LMI (1)
LMI (n-1)
GMF(0)
GMF(1)
GMF(n-1)
SELECT CIRCUIT
1208
HPI
DECODER
1206
GCL
Comparand Register
180
CBUS
508
PFx (0)
PFx (1)
PFx (n-1)
506
COMPARE CIRCUIT
GEN(0)
GEN(n-1)
PRIORITY ENCODER
1204

FIG. 12